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WHAT THE DEPARTMENT OF AGRICULTURE IS DOING FOR THE HOUSEKEEPER.

BY

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CONTENTS.

	Page.
Introduction	143
General activities	145
Relation of different bureaus to home activities	145
Nutrition investigations and home problems	148
Results of experimental studies and their relation to planning meals	151
Laboratory work and cooking problems	157
Food and its care in the home	158
Avoiding waste of materials and time	159
Conclusion	161

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By C. F. Langworthy,
Chief of Nutrition Investigations, Office of Experiment Stations.

INTRODUCTION.

THE Department of Agriculture in its varied activities comes very close to the life of the people, not only of those who produce the crops, but also of those who convert the raw materials of agriculture into finished products and of those who use them. Its interests extend to the town as well as to the country and to the home as well as to the farm.

So long as the housekeeper shared in the outdoor activities of the home and helped to produce the commodities she used she combined in herself the functions of producer, inspector, caterer, and user. She then had little need to discuss with others either the nature or the uses of the materials she handled. Her chief need was for technical skill, and this was received directly from her mother and in turn passed on to her daughter without the aid of outside educational agencies. When, however, under new conditions it came about that she bought a large part of the commodities she used, as is now the case even in isolated rural districts, it became necessary for her to express her desires with reference to the characteristics and qualities of the commodities she bought. The result, therefore, of the increasing importance of the home maker as a consumer of the products of agriculture was a new demand on her part—not so much a demand for new commodities as for knowledge and a demand for information which would help the family to meet certain world-old needs. The housekeeper has been asking for information on many home matters. She has sought to learn the effects of cooking upon the nutritive value of foods; she has asked what constituents are needed for an adequate and proper diet for her family and what foods are particularly suited to the needs of children; she has sought to know the comparative strength and wearing quality of various textiles used for clothing and for house furnishings,

and the best methods of cleaning and preserving such textiles; she has sought help in matters connected with household sanitation, such as water supply, plumbing, heating, ventilating, and lighting; she has been aroused to an interest in the problems of efficiency, and is looking for sources of reliable information, not only about the relative value of various kinds of textiles, but also about the comparative amounts of energy required for performing household tasks by different methods.

Housekeepers are also seeking help in conducting those household industries which still remain in the home and which usually fall to the lot of women. They are seeking the best methods not only in cooking, sewing, and housekeeping, but also in poultry raising, flower gardening, market gardening, and beekeeping. In their philanthropic and charitable activities also, which are rapidly taking the form of what is known as "social service," women are recognizing the need for definite kinds of information. They are finding that in helping to solve the many problems which affect the home and community they need to know the cost of living and factors which influence it and to compare expenditures with income. This is true whether they interest themselves in such fields of work outside the home, as membership on the boards of orphan asylums and other public institutions, as managers of boarding clubs and homes for students, and in such enterprises as the serving of luncheons for school children either as a philanthropic measure or for other reasons. They are realizing that it is necessary to have some definite information about such matters as the amount of nourishment which can be bought for a given sum, the wearing quality of textiles, and the relation of housing conditions to health.

Agriculture supplies the bulk of the raw materials used in the home for food, for clothing, and for household equipment. Since the Department of Agriculture gives attention not only to problems of production and distribution, but also to problems of consumption, and since, all things considered, the home is the greatest consumer of the products of farm and garden, it is inevitable that information should be forthcoming from the department which will help to solve many of the housekeeper's problems. The interdependence of agricultural

interests and home problems has also resulted in work in the Department of Agriculture undertaken particularly to meet the housewife's needs and to insure a better utilization of agricultural products in the home. A survey of the work of the department will show that it is not the case, as sometimes claimed, that the National Government bends its energies solely to the study of man's activities and overlooks the housewife and her problems.

GENERAL ACTIVITIES.

Broadly speaking, the Department of Agriculture is concerned with such matters as the production of crops, timber, and flocks and herds, with studies of plant and animal diseases and their control, with the establishment of standards of quality, with the protection of agricultural products from adulteration, with the processes for converting raw products of agriculture into finished products ready for use, with insect enemies and their control, with agricultural engineering problems, with rural economics, with rural life and activities, and with educational problems pertaining to all of these. Information is gathered in the field, in the laboratory, and in other ways, and the results are spread broadcast by means of publications, demonstration work, correspondence, personal contact, and teaching, the last largely through extension work, through the agricultural colleges, and through other organized methods of education.

In answering the questions which arise in the minds of the producers on the farms the investigator almost inevitably furnishes information about the commodities which the housekeepers buy and use and whose composition they should understand. Help for the housekeeper, who directs the spending of the family income, or, as the economist would put it, represents consumption, is, in fact, not only one of the inevitable by-products, but one of the very valuable main products of agricultural research, and is clearly recognized as such by the department.

RELATION OF DIFFERENT BUREAUS TO HOME ACTIVITIES.

It is interesting to consider in some detail some of the ways in which the work of the department contributes to the housekeeper's fund of useful informaton.

Through the Bureau of Animal Industry the department studies the breeding and feeding of farm animals and the questions pertaining thereto. It carries on this work primarily for the purpose of assisting those who depend for their livelihood upon the raising of stock, but the stock is raised in order that we may be supplied with meat, milk, butter and eggs, wool for clothing, and leather for shoes. Improving the production of farm stock means a larger and better supply of these products. This bureau interests itself in the handling of milk, primarily to benefit the dairy business, but the effort for cleaner dairies and more sanitary methods of handling milk benefits all who use this important foodstuff and the products made from it, and enables the housekeeper better to protect her family, and particularly her children, from disease. The Bureau of Animal Industry also investigates the existence of communicable diseases among live stock, studies their nature, causes, and prevention, and takes measures to wipe them out. This obviously benefits the farmer. In this and in its meat-inspection work it also safeguards the home by insuring a wholesome supply of animal products used as food.

The Bureau of Chemistry, among its other activities, has studied the composition of thousands of materials used in the home and many processes for converting the raw materials of agriculture into finished products. One has but to remember its extended studies of sugar, of bread and breadstuffs, of commercial food products, and so on, to realize how closely the results concern the home. The same could be said of its studies of fruits and their preservation, of storage and its relation to quality, and of the extended activities which have resulted in the establishment of food standards and the carrying out of the provisions of the National pure food law. Of great importance are the methods for research which have been developed by this bureau, and here, as in many more lines of its work, it will be found that it has made a very large contribution to the fund of information of use to the housekeeper.

The Bureau of Plant Industry could not labor as it does to increase the yield of crops which are used for food either for man or for live stock, and to protect plants from injurious diseases, without aiding the housekeeper in her efforts to

obtain a good and varied food supply for her family. It could not bring into the United States and domesticate food plants which have proved acceptable in other countries without helping the housekeeper in her efforts to secure pleasing variety in her bills of fare, as well as helping the farmer to profitably extend his activities. A study of farm accounts has also been begun, which includes records of household expenditures. To cite another instance out of many, the girls' home garden and canning club work directly benefits the home and the housekeeper. Designed originally to teach girls how to grow a crop, learn its uses, and preserve a surplus for winter use, the work has extended to methods of canning for market, and not only has started an interest in improved methods of housekeeping in a great number of homes, but has enabled many girls to earn money for further study.

The Bureau of Entomology, through its study of insects and their relation to man, is the housekeeper's best aid in her warfare against flies, mosquitoes, ants, moths, and other insects which carry filth, transmit disease from one home to another, or destroy materials and household equipment.

The Office of Public Roads can not carry on its activities without benefiting the home and the community as well as agricultural interests, for by improving the condition of roads it brings the home into closer communication with market, school, library, church, and social centers.

The Department of Agriculture Library, through its bibliographies and other publications and its close relations with teachers and others who seek information through published data, reaches the student of housekeeping as directly as the student of agriculture.

The Office of Experiment Stations has been studying problems which pertain to agricultural education, and more and more, as the years have passed and information has accumulated, agricultural education has come to include the activities of the home as well as the activities of the farm; so much so that at the present time home economics is included in the curricula of a large proportion of the agricultural colleges. It is worth noting that educational work on these lines is by no means limited to this group of institutions. Indeed, in educational movements of recent years nothing is more marked than the increased attention which is given to the

study of plant and animal life and to home economics. No one realizes more clearly than the teachers of these subjects in secondary schools, normal schools, colleges, and universities and the authors of textbooks intended for their use, how much the Department of Agriculture has contributed to the fundamental data used in the classroom.

Such statements might be extended and instances multiplied of ways in which these and other units of the Department of Agriculture render assistance to the housekeeper, as a result of its efforts to aid in the production, protection, and distribution of agricultural crops and the products made from them, and its related activities.

NUTRITION INVESTIGATIONS AND HOME PROBLEMS.

In addition to such work the department has for more than 20 years carried on work which relates directly to the home and its activities, through the nutrition investigations of the Office of Experiment Stations, undertaken especially to study the utilization in the home of agricultural food products, both animal and vegetable.

Early in the work the composition and nutritive value of the more common American foodstuffs were investigated. Following this work came studies of the kind and amounts of food used by American families of different occupations and incomes, which, with studies of the laws of nutrition, furnished information regarding the kind and amounts of food needed by men, women, and children of different ages and activities, and helped in the formulation of dietary standards which express these needs in definite terms. Many studies have also been made of the thoroughness of digestion of different foodstuffs, and as a result a large fund of information is available regarding the digestibility of a great variety of materials. The changes brought about in animal and vegetable foods by cooking processes have also received attention, and the effect of cooking upon digestibility. An important side of the work has been the development of methods and apparatus, including the bomb calorimeter and the respiration calorimeter, for use in the study of these questions. Information has been collected, classified, and standardized regarding the care of food in the home, home canning

and preserving, and preparing foods for the table. The study of these questions has involved cost considerations and the planning of meals which will adequately meet family needs as well as please the palate, and other similar questions. Incidentally, much information has been gathered regarding household sanitation, household conveniences, and other household problems.

It has been the object to collect facts which would explain household processes and to provide exact data which could be formulated and passed on for practical as well as scientific use. All this work has been designed not to supplant but to supplement empirical, practical knowledge which housekeepers have gained from uncounted years of experience and passed on from mother to daughter.

Such investigations as those enumerated bear the same relation to housekeepers' problems that systematic technical study bears to other industries. Commercial activities were long ago studied by scientific methods, since it had been found that gaining knowledge by experience is much more costly than gaining it by systematic study. Much more recently we have come to realize that it is equally possible to study the housekeeper's problems by laboratory methods. Yet so useful has such work been found, that now the housekeeper consults the investigator as naturally as the manufacturer does the engineering expert. And it is as true as it is in the case of business enterprises that systematic study is needed to furnish the broad foundation on which improvements in household operations should be based.

The results of the nutrition investigations have been published in technical bulletins, some 50 in number, designed for the investigator and the teacher, and in about the same number of Farmers' Bulletins and other popular publications, which summarize the laboratory research and general data gathered from other sources, in a form designed to meet the housekeeper's needs. That this has actually been the case is indicated by the very large demand for these publications from housekeepers, teachers, and others interested in home problems, and by the rapidly growing correspondence between housekeepers and the Department of Agriculture. Just as the farmer turns to the Department

of Agriculture and his experiment station for information, so the housekeeper seeks answers to her problems from the Department of Agriculture.

The Farmers' Bulletins referred to above have covered a great variety of topics, such as the food value of milk, sugar, bread, meats, fruits, vegetables, and eggs; bread and bread making; the economical use of meat in the home; cheese and its economical uses in the diet; mutton and its value in the diet; canned fruits, preserves, and jellies (household methods of preparation); the preparation of vegetables for the table; corn meal and its uses in the diet; kafir corn and cowpeas and ways of using them; and the care of food in the home.

Some of the other popular publications which have appeared have had to do with food customs and diet in American homes, with green vegetables and their value as foodstuffs, and with raisins, figs, and other dried fruits and their uses in the diet.

In connection with information concerning the nature and uses of foods and scientific data about them, recipes are often included for preparing foods for the table. These recipes are gathered from many sources; they are carefully compared and those are selected for study which represent essentially different modes of preparation. Those chosen are modified when necessary and are carefully tested and standardized before they are published.

The demand for technical information has been larger than the supply in most cases. For the popular publications it has been very large indeed, as may be seen from the fact that to date over twelve million of the Farmers' Bulletins on food and nutrition topics have been needed to meet the requests for them from housekeepers, teachers, students, and others, which is an average of more than 1 bulletin for every 10 persons of the ninety-odd millions making up the population of the United States. The demand for circulars and other popular publications on the subject has been correspondingly great.

A publication designed to help the housekeeper as well as the student to understand the relative value of different foods is the series of 15 food and diet charts printed in color and showing in graphic form the composition of the common

food materials and summarizing some fundamental data regarding nutrition and dietary standards. These charts might be called "food maps," since they show, in a simple way, the kind and proportion of nutrients present in common food materials as well as their value as sources of energy for body needs.

The inquiry naturally arises, Can the results of investigations and publications such as those enumerated be used to the housekeeper's advantage, and are they desired? The proof that they are so used is found in the growing interest in the subject, in the increased demand for more work of broader scope, and, most directly of all, in the very numerous letters received from housekeepers and home makers giving their opinions as to the work and its importance. An answer to the first part of the question raised can be given by citing some illustrations of ways in which such data on subjects related to the home have contributed to the solution of home problems, and in the following pages attention is directed to some matters of interest to the housekeeper which are discussed on the basis of results obtained in the department's studies of nutrition.

RESULTS OF EXPERIMENTAL STUDIES AND THEIR RELATION TO PLANNING MEALS.

Perhaps no subject is of more interest to the housekeeper than the preparation of food materials which are palatable as well as adequate and nourishing. It need hardly be said that to be thoroughly satisfactory a diet must do more than furnish sufficient building material and energy to meet the needs of the body. It must also furnish the material in a form in which the body can make use of it without disturbing the digestive organs and must be made up of wholesome materials, well prepared, and must be palatable, in accord with rational dietary habits, and reasonable in cost as compared with available income. Individual food materials differ somewhat in the ease and readiness with which their nutrients can be turned to account in the body, but with healthy persons these differences are less significant than is commonly supposed. Proper preparation is very important, for the illness caused by bad cooking must be very great. Some people imagine that there is no particular advantage in making

a diet attractive beyond the mere gratification of appetite, but physiologists think differently, for scientific research has shown that appetizing diets actually stimulate the action of digestion. Variety in food is a great aid in making meals appetizing and also serves to insure a supply of all the chemical ingredients needed.

To say that a family bill of fare must be appetizing and varied does not necessarily mean that it must be costly as well. At first sight, it might seem difficult to secure these qualities without buying rather expensive materials or serving very fancy dishes, but the theory does not hold in the case of food any more than in that of clothing and house furnishings. A house furnished without regard to expense and also without intelligence and taste may be a dreary place after all, while one furnished with inexpensive materials, chosen by a person of experience and taste, may be really beautiful. In the same way, meals do not need to be made up of elaborate dishes or delicacies in order to be attractive. Indeed, the staple food materials skillfully combined and simply but attractively prepared are more pleasing in the long run than elaborate living, and more wholesome as well. Just as the test of a woman's ability in dress is to get suitable and attractive effects with relatively low expense, so the test of her catering ability is to give her family an ample supply of wholesome and pleasantly varied meals with an outlay of money and time proportionate to her income and circumstances. There is nothing new in this ideal; good housekeepers have always tried to realize it, and, though they may have been unconscious of its physiological significance, have handed down the tradition of such suitably balanced combinations of food materials from generation to generation. The novelty lies in the fact that science is just catching up with the home makers and is finding the reasons for some of the old beliefs, testing all, that the useful may be retained, adding to the store of useful fact regarding materials and processes, and formulating the results of experience and experiment in such a way that they may be passed on to those who need the knowledge. This has an advantage over tradition only in that it substitutes exact for general data. It also enables the teacher to formulate knowledge so that it may be used in the classroom. Not only may the home maker, if for any reason she has not

learned her art from the older women in her family, correct the deficiency by the study of publications dealing with home-making topics, classes for home study, etc., but, more important still, the young generation, facing as it does new conditions of living, can be grounded in the schools in the principles and practices of home making adapted to those conditions.

Variety in the diet can be secured both by providing different kinds of food and by preparing staple foods in different ways, and the best results are obtained by combining both methods. When the housekeeper studies the list of common foods and the combinations made from them, she will probably find that as regards their place in the menu they fall into two general groups—those which, like bread, potatoes, milk, eggs, etc., have little distinctive taste, and those which, like cheese, seasoning vegetables, some sweets, cooked meats, etc., have marked and individual flavor. She will further find that the mild-flavored materials are the ones which are used in the greatest quantities, meal after meal, while those of pronounced taste appear in smaller amounts, or some of them only occasionally. To put it in another way, she will depend largely on the first group to make up the bulk of her dietary, and on the second to vary it. In cookery, some foods require only simple methods to make them very palatable. Tender steaks, or chops, in cooking, develop delicious meat flavors and require no highly flavored vegetable seasoning or condiments to make them palatable. In themselves they furnish flavor sufficient to accompany potatoes, rice, or other foods of mild flavor. On the other hand, in stews and other dishes made from the cheaper cuts of meat, carrots, onions, or other distinctive flavor is usually added to supplement that of the meat flavor, for the cheaper cuts are not usually of such a texture that the best results can be secured by such simple methods as broiling or roasting. Children's preference for bread and butter with jam is explained by their unconscious desire to add flavor to bulk. The housekeeper who makes a dish composed of cheese and macaroni, or of meat and rice or potato, etc., applies the same principle. The great variety of pickles, preserves, and elaborate pastry which American housekeepers used to consider necessary represented another instinctive effort to vary, by adding flavor, the monotony which was inevitable, particularly in winter fare, before the

days of easy transportation and storage brought fresh fruits and vegetables the year round.

If the good housekeeper analyzes the make-up of her meals a little further, she will probably find that she arranges them, perhaps unconsciously, according to more or less definite principles. In most American families the chief daily features of breakfast are bread of some sort with butter, very often fruit, and some kind of breakfast cereal, and coffee, tea, or cocoa, with their usual accompaniments of sugar and milk or cream. This combination is varied by omitting either the bread or the cereal (which is logical, if one wishes to do it, since they provide the same sort of nutrients, though in different form), by changing the kind of bread or cereal, or by combining with them some other materials. If the members of the family are engaged in much muscular work, the meal will be made more hearty by the addition of some hot dish, as eggs, meat hash, creamed fish, bacon, and possibly honey or sirup. If their work is light, however, less variety or smaller portions will probably be preferred.

The custom of serving fruit at breakfast is undoubtedly healthful and not extravagant if low-priced fruit is chosen. Of course, it may be cooked or canned fruit, if this is more convenient. It does not increase the housekeeper's work so much if it is served with the other breakfast dishes as it does if made a separate course, for each course means extra time and service. This is a commonplace illustration of the principle that the housekeeper who has many demands on her time or who has limited help should select ways of service which are simple and time-saving rather than those suitable for families where other conditions prevail. Well carried out, the result is pleasing in either case.

Tea, coffee, or cocoa is usually taken at breakfast and other meals as pleasant flavored hot beverages only, and owe their food value mainly to the cream, milk, or sugar used with them. Cocoa itself has a greater food value, but, if the beverage is made with water, the difference in the food value of a cupful is not very large, as the amount of cocoa used per cup is not great. When made with milk, it is, of course, more nutritious. The value of milk as a beverage must not be overlooked, especially in the case of children. Skim milk is not so hearty as whole milk, but it is still a nutritious food

and might well be used more freely than it is, especially where economy is necessary.

Dinner, the heaviest meal of the day, usually has a meat or fish dish as its principal item, with vegetables and bread and butter, and perhaps a relish, such as jelly, to accompany it, and a sweet dessert to "top off with." If the rest of her dinner is lighter or simpler than usual, a good manager often finds it worth while to let a soup precede the meat. This adds to the attractiveness of the meal and need not mean much extra work. Unless it is a thick broth or is made with milk, the soup has little nutritive value, but it is usually relished, especially in cold weather, and is often an economical way of using up left-overs. The serving of a little soup as an appetizer for the first course of dinner is a common custom in homes where somewhat elaborate meals are the rule. Since it adds little to the nutritive value of the meal, the very general omission of soup as a regular part of dinner in homes where labor saving is sought is a sensible custom. A way of piecing out a very simple meat course is to make the vegetables especially attractive and more nutritious, perhaps serving escalloped potatoes, which have milk and butter added, or macaroni and cheese instead of plain boiled potatoes; or, if the family is fond of such things, providing some kind of simple vegetable or fruit salad, perhaps as a separate course. On the other hand, if some expensive cut, such as beefsteak, is the main feature of the meal, the other parts of the dinner may be made simpler than usual and the total expenditure kept not far from the average, or an expensive meal on one day may be followed by a judicious use of left-overs the next day. In parts of the country where good fresh fish is available it makes an excellent substitute for meat, for sea food has a similar nutritive value, usually costs less, and is quite worthy of more frequent use than is common. Dried, pickled, and smoked meat and fish also have their uses to vary the diet, and can often be used for economical dishes. Cheese, eggs, beans and similar legumes, and nuts are other foodstuffs which may be used for the preparation of dishes to replace meat if one wishes to do so.

In choosing the vegetables for a meal, it is worth while to remember that potatoes, both white and sweet, the staple carbohydrate vegetables, contain much larger proportions

of nutrients than most vegetables. They resemble cooked macaroni, rice, and hominy in food value, and these can be used to take their place when convenience or the wish for variety makes this desirable. It would be better judgment not to serve several of this group at the same meal, not because, as it is sometimes stated in popular literature, the body is harmed by receiving several sorts of starch at one meal, or because one would overeat of starchy foods, but because the meal would be better balanced as well as more in accord with good practice if it included other types of vegetables instead of duplicating those of similar composition. Green vegetables, such as beet tops, kale, spinach, chard, and other pot herbs, fruits like tomatoes, green corn, green peas, and string beans, and the highly flavored root vegetables, such as parsnips and turnips, should be used in combination with the more nutritious kinds, not only for the sake of their flavor, but also for furnishing the body with valuable chemical substances, especially mineral elements.

Dried beans, peas, cowpeas, and lentils contain a good deal of nitrogenous material as well as starch, and can be used with economy to lessen the amount of meat. Thus the old custom of serving baked beans, peas, and bacon, and similar dishes, as the heavy dish of a meal is justified on the ground of nutritive value.

The custom of finishing dinner with a sweet dessert is almost universal in this country and is, on the whole, a reasonable one. Badly cooked pastries and puddings very often cause digestive disturbance, but the simpler kinds, properly made, are wholesome and are fairly nutritious, and fruits, fresh, dried, or cooked, and nuts are always in order and easy to serve. The desserts that require much time and labor to prepare are usually not worth while for ordinary family use, though suitable enough for special occasions. On days when the housework is especially heavy it may be good management to substitute fresh fruits or preserves with cakes or cookies for a "made" dessert. If the rest of the meal is light, a nutritious dessert is in order, and milk, eggs, butter, and sugar are ingredients which contribute materially to the food value of such dishes.

Supper is usually a much lighter meal than dinner, although in many families it includes one hot dish and a sec-

ond course of preserves and cake. Here, as at breakfast, some kind of bread with butter and a hot beverage form the basis of the meal with an appetizing dish of eggs, meat, cheese, or vegetables to supplement them. This is the meal at which the capable housekeeper most shows her ability in using up left-overs, providing appetizing surprises which do not require much new material or time. It is mistaken economy to add a good deal of expensive materials in order to use up things of little value or to attempt fussy dishes that require long preparation. As far as everyday supper is concerned, it is usually good policy to avoid elaborate dishes and let the most of the time and strength expended for such things go to the main meal of the day. This is especially true where the women of the family do all the work.

While noon dinner and supper are the rule in most rural districts and smaller communities, in other parts of the country, as everyone knows, lunch and evening dinner take their place, as is inevitable where the wage earners must be away from home all day long. In such cases, what has been said about supper applies to lunch. If some of the family carry their lunch away with them, bread and butter again form the usual basis of the meal, with cold meat, cheese, hard-boiled eggs, or some other appetizing as well as nutritious food, and perhaps fruit and cake to complete and vary it.

LABORATORY WORK AND COOKING PROBLEMS.

Modern science has been applied to the problems of cooking as in the case of menu making. It explains and tests the old-fashioned methods, helps in the finding out of new ones, and shows the relation of the preparation of food to dietetics, physiology, and hygiene. From the scientist's point of view, cooking is, ordinarily, applying heat so that it produces desirable physical and chemical changes in the raw material. It also sterilizes food, if need be, as any parasites, molds, or bacteria, etc., that may be present are destroyed by the heat. Sometimes, as in the case of a cereal like oatmeal, the consistency of the material is so changed that what would otherwise be a hard mass difficult to bring into condition to be worked upon by the digestive juices is in proper condition for eating. In other cases, as with broiled and roasted meats, pleasant flavors are developed. In some

instances, as in the case of bread making, the changes are much more complicated. The proportion of yeast or other leavening agent to be used with different kinds of flour and with different methods of mixing dough has been carefully tested in connection with the nutrition investigations, as has also the digestibility of bread made from different sorts of flour. Well-made bread of all kinds is nutritious and very thoroughly digested. The use of several kinds is an easy way of securing variety in the diet.

The effect of cooking upon vegetables has been noted, and the reason given for such points as the strong odor and supposed indigestibility of cabbage. As the cabbage cooks, the heat breaks down the compounds which give the characteristic flavor to it and volatile bodies are given off, some of which contain sulphur. If the cooking is done in a well-ventilated place, these persistent odors are carried away. If the cabbage is cooked too long, it changes color, any green portion becoming yellow or brown, and the white portion dark-colored. The flavor also becomes more strong, and there is good reason to believe that overcooked cabbage is a common cause of any digestive disturbance experienced with it and that cabbage cooked only until tender does not cause such disturbance. It is generally true that overcooking green vegetables should be avoided, as it injures flavor as well as appearance. Asparagus, string beans, and green peas are vegetables easily injured by too long cooking. They are at their best when cooked just long enough to make them tender, but not to destroy their attractive color.

Other technical studies have shown the changes which occur when meats are cooked in different ways and the digestibility of the different kinds and preparations of meat. The results indicate that the differences are much less than is commonly supposed, all kinds and cuts prepared in the usual ways being very thoroughly digested.

FOOD AND ITS CARE IN THE HOME.

People used to think that cleanliness was mainly a matter of personal preference. Since the bacteriologists have shown that diseases as well as decay and loss of material are often caused by micro-organisms which are commonly harbored in filth and dirt, we have come to know that dirt is not only

disagreeable, but is also dangerous, and that cleanliness is nowhere more necessary than in all that pertains to food.

Perishable food materials are particularly likely to spoil if they are exposed to dust or kept in warm, damp places which encourage the growth of molds and bacteria. One of the popular bulletins of the department discusses the care of food in the home and suggests practical, inexpensive ways of keeping it properly. Every up-to-date dairyman and the public, too, know the importance of absolute cleanliness in handling milk. If one applies the same reasoning to other food materials it is evident that the kitchen and pantry need to be taken care of as scrupulously as the dairy and that the housekeeper ought to be as careful in cooking the food she serves as must those who handle milk. So much has been said about the danger of flies as carriers of diseases that it seems as if everyone must realize the importance of keeping them out of the house, especially out of that part of it where food is kept or eaten; yet thorough screening is still far from usual, even in kitchens and dining rooms, and many families seem careless of this very real danger.

AVOIDING WASTE OF MATERIALS AND TIME.

Another problem which vexes the thrifty housewife is that of waste. From the dietary studies conducted by the department, and from other data, it has been estimated that in American families the waste varies from practically nothing to one-fifth of the edible portion of the food purchased. The waste may be due to careless buying, improper storage, buying materials which contain large amounts of more or less useless substances, such as meat bones or the skins, seeds, or tough stems and leaves of vegetables; preparing foods in a careless way, so that little is eaten and much wasted; or, what is perhaps the most common fault of all in this country, providing and serving more than the family will eat and not using up all suitable left-overs for making appetizing dishes. It takes considerable skill to estimate exactly how much of each dish should be prepared for a given meal, but therein lies one of the great secrets of economical catering. Such skill must be acquired largely by experience, but the more the housekeeper knows the ways of observing and recording data and of the nature of her materials and their properties.

the easier it will be for her to profit by her experience. Information on these and related topics has been obtained in connection with the study of food and nutrition problems.

The waste of materials is not the only waste that is found in the household. There is often a waste of the housekeeper's time and strength which, though it may not show in the cash account, is just as bad economy. A good housekeeper considers the labor involved in preparing a meal just as much as she does the materials, and will weigh the question whether this simple or that more elaborate dish is really economical or worth while when the labor supply is short. She will see that the cookstove, sink, cooking table, and other kitchen furniture are so placed that she can work conveniently and not waste time and strength by walking needlessly from one to the other. She will also try to plan the preparation of the meals so that one part of the work will dovetail into another and, in general, try to make "her head save her heels."

This question of saving work in the kitchen leads to the very important one of household conveniences and labor-saving devices. The housekeeper on the farm, or in the small town, has the advantage of home-grown vegetables and other foods, and with a little time and trouble supplies her table with much which is costly in larger communities. No one can deny, however, that the city housekeeper usually has an advantage with respect to conveniences, for her kitchen invariably has running water, a good sewerage system, and often a gas stove and a convenient ice box, not to mention its nearness to markets and to bakeries and shops, where she can buy things ready to eat in an emergency. In far too many rural homes, on the other hand, water must be carried in and out, coal or wood and ashes must be carried long distances, and often even such simple conveniences as sinks, window boxes for keeping food cool, etc., are not found. Although it is often harder to get help in the country than in town, and outside aids to housekeeping, such as laundries, are seldom accessible, there are generally fewer of the labor-saving devices, such as washing machines and other laundry devices and labor-saving cooking utensils, in use in the country than in town households of corresponding means. Many progressive farmers realize that it is not only unfair but poor

economy in the end not to give the housekeeper her share of new equipment. Family welfare depends much more upon having the home maker in good health and spirits than it does upon a few extra dollars in the bank, and making the farm as attractive as circumstances allow is one of the surest ways of preventing the children from becoming dissatisfied with country life. Information on such matters as home conveniences is contained in bulletins which the Department of Agriculture has issued.

CONCLUSION.

This survey of some of the results of the nutrition investigations and of the problems to the discussion of which the nutrition publications contribute shows how the whole question of home betterment is bound up with food and its preparation. If the housewife can learn to make a wiser use of her resources and can economize her time and strength by careful planning and by adopting labor-saving devices, she can provide her family with as wholesome and economical and at the same time more healthful meals, and can lessen her household labors, and so can have more leisure and energy to cultivate other interests also.

The Department of Agriculture feels that one of the most interesting results of its work is that people at large have come to regard it as a bureau of information. This is as true of the studies of food and its nutritive value and other features which bear on domestic science as of any other branch of its work, and it is a gratification to find that each year more housekeepers present their problems and ask for information regarding food and other matters of home management. Such close relations with the housekeeper and with educational institutions seem to demonstrate not only that this work of the department for the homemaker is of scientific value, but also that it is of direct practical aid to the housekeepers of the United States in their efforts for efficient and rational home life.

No one realizes more clearly than those concerned in it how broad is the field for such work and how few relatively of the housekeeper's problems have had the careful study which they merit. Clothing, household equipment, labor-saving devices, home conveniences, home sanitation and

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hygiene, the relation of right methods of work to the prevention of fatigue—these are some of the topics which are as much in need of study as are questions of food and economics of the household. Methods of study and ways of bringing the results of laboratory research to the housekeeper already tried and found good in department work are available and as well adapted to the study of these problems as to those in which they have been already tested. It speaks well for the housekeeper's interests in the future that the Department of Agriculture is giving the matter attention and endeavoring so to adjust its activities that it may still further meet the housekeeper's needs, for it realizes that the housekeeper is the great factor in determining the use of agricultural products, and, more important still, that in her hands is the welfare of the family.

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